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AUTHOR Heyer, Arthur
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ABSTRACT

A disabled man describes several types of assistive equipment that help in his daily life. He begins with a discussion of a new mouthstick design, which he says is the cornerstone of his functional independence. He proceeds to describe a turntable desk which provides access to surrounding items, a swingaway portable desk which he carries on his wheelchair, a stick-on key-lock which allows one-handed or mouthstick users to depress two or more keys of a keyboard simultaneously, an easy load diskette system, a typewriter-printer with paper loader, a blanket remover and a tongue operated telephone arrangement. (CL)

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Give Me Tools And I Will Do The Job

Arthur Heyer
Extensions For Independence
San Marcos, California

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Introduction

Assistive equipment makes life easier and happier for everybody. It dignifies and makes disability a natural part of a family's life: The disabled brother becomes a brother with special needs. Not a burden on the family.

The clutter of prototypes encountered in my office suggest a strong linkage to equipment. However, I do not consider myself a gadget addict. I look at my devices merely as tools to accomplish tasks.

At one time there were things I wished I could do. Now that I have the means to do them, I don't feel disabled anymore.

Assistive equipment has been a crucial part in my life since I became disabled 23 years ago at age 17. Most of this equipment has not been immediately available to me however. It has been created to solve my needs, and then perfected through the years.

In my presentation I will describe some of this equipment and show how it has been beneficial to me and those around me. I will start with a discussion of my newest mouthstick design (a refined version of th Heyer-Abadie Modular Mouthstick, which has been the cornerstone of my functional independence), then I will talk about equipment designed around the use of this mouthstick, with emphasis on equipment related to the use of computers. And I will finish my presentation with a brief discussion of three other devices that have helped to make my life easier to live.

1. Heyer-Abadie Modular Mouthstick

This mouthstick has important features which make it unique

in performance capabilities. We first called it "Talking" Mouthstick because the user can easily talk while working with it. This feature is especially useful for instructors when they need to talk and point or write at the same time.

The part that goes in the mouth -- the mouthpiece -- is flat and V-shaped to be gripped with the molars of both sides, leaving room in the middle for the tongue to move, and a free path in between the front teeth for air to flow out of the mouth; two characteristics which are essential for talking. Also, it is important to note that leaving the tongue free to move makes swallowing easy.

The two prongs of the flat V-shaped mouthpiece are tapered in thickness to the end, following the natural bite angle. This tapering eliminates a concentration of pressure that would otherwise occur when clenching the mouthstick between the maxillary and mandibular molars.

The prongs are covered with soft plastic sleeves for better grip and comfort.

The mouthpiece is the basic element to which our standard telescoping mouthstick "body" or other "bodies" for special purpose are attached.

To extend or shorten his mouthstick, the user first cranks loose a small lever that locks the mouthstick length. He then does the telescoping by shaking the mouthstick held in a downwards position, or by means of a telescoping aid, a fork-like friction device that mounts on a stand.

Then he cranks the lever tight to lock the mouthstick in the extended position.

An optional feature of this mouthstick is a mechanism for independent interchange of implements. With this arrangement, the mouthstick user can interchange from an eraser tip to turning pages...to a pen for writing notes.

The pen is held at the end of the mouthstick with an inclination similar to the way a pen is normally held with the hand. The inclination makes the tip of the pen visible for instant feedback of one's writing.

The implements, such as eraser tips, brushes, etc., are inserted in thin-walled aluminum cylinders which fit snugly on the pen or mechanical pencil, or in the plastic caps of a commercially available erasable-ink pen, which is an integral part of the mouthstick.

The caps and the aluminum cylinders, with their implements inserted, are kept in this Docking Holder when not in use, ... use picked up as needed.

The modular design of the system allows for custom fitting to individual needs. The Docking Holder can be combined with a bracket that mounts on the edge of a desk or lapboard, or with a pedestal that mounts on any flat surface.

New implements are being created for use with the system, such as a hook used to interchange floppy disks of a computer, or daisy wheels of a typewriter or printer.

2. Turntable Desk

A turntable as a desk is ideal for persons with limited reach. It provides easy access to a number of things by just rotating it.

The turntable, which is supported by precision balanced ball bearings, is easy to turn, ... even when heavily loaded.

These desks have been designed modular to fit individual needs. The legs are extendable for height adjustment. Extension tables, for extra working surface, can be attached to either side of the desk.

One Extension Table makes our Single-Turntable Desk in an "L" shape. A second Extension Table extends the length of the desk and makes it "U" shaped. The extended desk can then accept a second turntable that can be placed on top.

The resulting desk, composed of four modular sections, makes a highly functional workstation for the wheelchair-bounded student, clerk, or business man.

On one turntable, one can have files and other reference material. On the other turntable, there could be a computer with some more extra space left for additional files. The telephone is accessible on the Extension Table next to the files and the typewriter, which is also a letter quality printer, could be on the other Extension Table, next to the turntable which has the computer.

Being on a turntable, the computer is also accessible to a secretary who can sit in front to take dictation.

For extreme cases of weakness or paralysis, electric motors can be incorporated to do the turning. An easy to install motor kit for each of our Turntables-Desk models is available. The user can operate the motors by means of a sensitive micro-switch control box we provide with the kit.

Mouthstick users, for example, need some kind of solution to the problem of not being able to hold one key while pressing another. Stick-On Key-Locks are a solution.

These keylocks allow one-handed or mouthstick users to depress two or more keys of a keyboard simultaneously.

The keylocks, designed as a lever with two inclined planes at their tips, are moved, by hand or mouthstick, over the key in order to depress it. The key then remains depressed until the keylock is pushed back.

The base of the keylock comes with double-sticky tape on its bottom. It is to be stuck next to the key is going to lock, directly on the keyboard or on an overlay which some computers may require.

For some computer models, one Key-Lock can operate two adjacent keys alternatively, such as "CONTROL" and "SHIFT" on some computers.

5. Easy-Load-A-Diskette System

It is a set of simple and inexpensive aids which allows frail hand and mouthstick users to interchange floppy disks quickly and unassisted.

One aluminum tray is attached to each disk drive. The tray is used for the user to lay a floppy disk in position for proper feeding into the disk drive.

Wire hangers, which attach to each floppy disk, allow the disabled user to transfer the disks from a storage case to the tray on the disk drive, or vise versa, by means of a specially designed hook.

3. Swing-Away Portable Desk

Next to my mouthstick which is my "hands", and my power wheelchair which is my "feet", a Portable Desk I carry on my wheelchair everywhere I go has been a most useful piece of equipment.

The portable desk is designed to provide wheelchair users with the convenience of an organized mobile workstation. It is basically a box whose to is used as a working surface, and slides to either side, or lifts open, thus making accessible the things a quad may carry in its interior, such as a dictionary, tape recorder, papers, etc.

A folding ramp is used for sliding objects to a higher surface, like a Turntable Desk.

Mounted on a single telescoping arm, the Portable Desk can be raised or lowered, placed over or under the arms of the user, closer or further away to suit individual needs, and can also be swung away.

The motorized version gives freedom and fun to high-level quads. For example, leg positioning can be checked by swinging the Portable Desk away.

"I have had great fun carrying my little niece on my lap-board. She likes to see how I work on my computer, and she is of great help by being my hands."

4. Stick-On Key-Lock

Computers are the perfect tool that give the handicapped easy access to gainful employment. Some difficulties have yet to be overcome, however.

6. Typewriter-Printer With Paper Loader For Quad Operation

For office work, loading paper into a typewriter or printer is such a frequent job that soon merited a mechanism to do it unassisted.

A paper loader was designed for a line of electronic typewriters made by Brother. To feed paper into the typewriter, the sheet is first placed on the transparent platform.

This is done by means of a specially designed paper tray equipped with a folding-ramp. The tray has room for an adequate supply of typing paper, envelopes, cards, etc.

Once the paper has been placed properly, the transparent platform is lifted and the paper is automatically fed into the typewriter. Any type of stationary can be fed with the system, such as carbons, envelopes, cards, etc.

But the paper loader was not the only adaptation required for independent use of a typewriter by a mouthstick user.

The typewriter is tilted for better visibility. It is a single element machine, and by tilting it, the handicapped operator can more easily see what he is typing.

The levers that are moved for securing the paper in position needed extensions. The push button mechanism used for releasing the platen needed a lever and locking device. This feature allows for fine vertical line adjustments. The knob used for "manually" turning the platen also needed an extension. The "Control" key needed a key-lock for operation with a mouthstick. A couterweight was added to keep the lid open while interchanging printing elements with a mouthstick.

Now, it can be said that there exist no true obstacles for full typing capabilities by severely handicapped persons.

7. Blanket Remover

Knowing how much to cover myself when going to bed was a problem for a long time until I had two pieces of equipment made and installed: a window opener and a blanket remover.

A motorized window opener helped diminish the problem. This way I had some control of the temperature in my room by opening or closing the window at will.

This approach works relatively well in winter. However, it is ineffective on warm days where the outside temperature is about the same as that inside.

The problem was finally solved when I had an electro-mechanical device installed to remove or replace a blanket. The device is basically like a motorized looped clothesline extending a few feet above my bed lengthwise from wall to wall.

An aluminum tube with a length equal to the width of the bed was used like a trapeze suspended on two cords.

A blanket, 74 inches wide, was folded lengthwise and hooked on the aluminum tube.

Notice in the drawing that the bed is separated from th wall and also that one of the pulleys is substantially lower than the other. This arrangement allows for the blanket to be high against the wall when not in use and to cover more fully when being used.

Now I can go to sleep in piece, knowing that I will not have to suffer from cold or heat, or have to call somebody in the middle of the night for adjustments.

8. Tongue Operated Telephone Arrangement

A means to place a telephone call from my bed was required. Available sip and puff, single switch, etc., systems for dialing numbers are expensive. The telephone company offered and installed a single-switch system to access the operator. The device consisted of two electronic boxes connected to a speaker-phone, and a tongue-operated switch. Rental for such equipment was around $12.00 per month, and it broke twice in the first two weeks of operation.

I returned the equipment and purchased a seven dollar push button telephone. A bracket was made to hold the telephone in a standing position by my face in my sleeping position. A cam-type mechanical switch allows me to turn the telephone on or off. The device was attached on the metal plate where I have the micro-switch box I use to operate the window opener and the blanket remover. The telephone, as well as the micro-switches, are within reach to fully operate with my tongue.

The total cost of custom making the device plus the cost of the telephone itself was less than $100.00. It works fine. I have used it for almost two years and it had never failed. Another advantage of this arrangement is that it is simple, small and easy to replace in case it breaks.

Concluding Remarks

Being a consumer of my own creations has given me the unique opportunity to fully test a new device before marketing is considered. My choice to become an engineer was a good one; and I encourage others to pursue their career desires in spite of their

handicaps ...especially if they have the opportunity of having their functional needs resolved (through equipment?).

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